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ADOLF ALT, M. D.

ASSISTANT EDITOR

W. F. HARDY, M.D.

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THE AMERICAN JOURNAL
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VOL. XXXIII. OCTOBER, 1916. No. 10

ORIGINAL ARTICLES.

AN UNCOMMON EPITHELIAL TUMOR OF THE BULBAR CONJUNCTIVA, PROBABLY AN UNPIGMENTED NÆVUS CYSTICUS.

By Adolf Alt, M.D.
ST. LOUIS, MO.

The little interesting tumor of the bulbar conjunctiva which I intend to describe in the following was given to me for examination by Dr. W. F. Hardy, of this city, who kindly furnished me, also, with the following history.

B. T., aged 19, came complaining of a small growth on the temporal side of the globe O.S. August 22, 1916. He had noticed the growth for about a year. It was not painful and had given him no trouble. There was no antecedent history throwing light on the condition other than that eight years ago he was struck in the O.S. with the limb of a bush. What part of the eye was injured and how severe it was he did not remember. It was evidently of a trivial nature, as it caused no trouble at the time and received no treatment. The small conjunctival growth has gradually, he states, increased in size. It was this more than anything else which prompted him to seek advice. Both eyes except for a small refractive error, appear perfectly normal, vision either eye 20/12.

Examination showed a small fleshly looking growth somewhat hemispherical in shape with the convex surface temporally, slightly smaller than a split pea, situated over the insertion of the external rectus approximately 6 mm. from the limbus. It seemed sharply limited, benign looking and non-pigmented. Passing vertically upwards from the lower portion of the globe near the external canthus, to the horizontal plane of the globe, were several bloodvessels, one larger than the others and appearing to be a vein. These vessels then bent nasalwards, taking a horizontal course and entered the growth on its temporal aspect. These

vessels appeared to be relatively large in proportion to the size of the tumor. The patient was told it was a conjunctival growth most probably of a benign nature but that conservatism called for its removal.

August 23rd, the growth was removed, making a horizontal elliptical incision and going wide of the tumor. Cocain anæsthesia. It was expected that considerable bleeding would ensue from the cut vessels, but none occurred. Closed with two stitches.

27th. Stitches removed. Wound healed.

29th. Patient returned home with instructions to return in a month. Has failed to do so to date.

HISTOLOGICAL EXAMINATION.

Sections of the little tumor, viewed with a low magnifying power, are shown to consist of a more solid superficial tissue which in the deeper parts gives way to a much looser tissue consisting chiefly of trabeculæ of varying thickness, enclosing numerous smaller and larger openings. These openings are in part almost perfectly round, others are more oblong. sometimes the dividing trabecules have given way in part and thus two or even three neighboring openings are jointed into one large one of irregular shape. Thus the appearance of the tumor under low power is that of a cystic tumor, and on account of the epithelial cells which apparently line the walls of all of these openings, reminds one very much of a cystadenoma, yet the appearance is not exactly the same.

There are no chromatophores in any part of this tumor.

On closer inspection it is seen that from the surface epithelium, which has lost its regular appearance, numerous small solid cell pegs dip into the underlying tissue and gradually grow thicker. Very soon after this growth into the depth has been started the central cells seem to have given way to some destructive influence, and finally, by continued destruction of cells from center towards the periphery, the superficially solid cell cylinders are changed into the roundish openings seen even macroscopically in the deeper tissue. The remaining tissue between these epithelial formations is made principally of cells of varying shape, among which are a great many plasma cells; is tensely infiltrated with small round cells and contains numerous bloodvessels of which some are evidently distended.

In studying the sections with a higher magnifying power, the outer epithelium is found to consist throughout of squamous

epithelial cells. It varies in thickness and in some places appears to consist of one or two layers only. In these numerous places the inner layers of epithelial cells have evidently lost their union or contact with the outer ones and, so to speak, dropped down into the underlying tissue, just as we see it in nævi (Conf. "Two cases of nævus of the conjunctiva bulbi," by A. Alt, this Journal, October 1913, page 294). These dislodged epithelial cells then appear to form the thin solid cell cylinders. Yet, the cells forming these solid cell cylinders in many places very quickly undergo a regressive metamorphosis which seems to start always more or less centrally. The, at first, closely packed flat cells with a large oval nucleus seem to lose their sharp outlines, the central nuclei no longer take up the stain, and the nuclei which still take it up form one or several more regular peripheral rows in the transverse sections of these cylinders, while the centre is changed into a transparent more or less amorphous mass in which here and there a nucleus is still to be seen. In some of the cell cylinders the necrosis which the cells are undergoing seems to be of a different type. Here it seems to be rather a coagulation necrosis. In such cylinders all living cells have disappeared, and in their place the cylinder is filled with a grayish mass which takes up absolutely no stain, but still shows radiating separating lines, probably the outlines of the former cells. Here and there a lymphocyte is found in this apparently dead material. In some other cylinders there are distended cells, the counterpart of conjunctival goblet cells. Again, in numerous other cylinders

the central cells are succumbing more and more to the degenerative process and generally a lumen appears. In some this lumen is partly filled with cell debris and a few leukocytes; in others it appears perfectly empty. The remaining cells surrounding the lumen form a fringe, sometimes with a beautiful scalloped edge. The scallops are formed by somewhat enlarged cells which, with a roundish outline, protrude tongue-like into the lumen.

Their nuclei stain poorly. In such cylinders there are usually quite a number of peripheral cells, forming one or two layers, which still appear perfectly healthy and take up the stain as normal epithelial cells do.

Still further in the depth of the tissue the lumina of the cell cylinders, which have assumed a larger and larger diameter, are almost all lined simply with one irregular layer of flattened epithelial cells. The lumina are then separated from each other only by a thin connective tissue trabecule, which never, as far as I could find, contains a bloodvessel. Where the destruction of cells has not yet reached this height and where infiltrate tissue of varying thickness separates the large openings, small cell cylinders are quite numerous in this separating tissue and most of them are, also, undergoing a retrogressive metamorphosis.

The tissue underlying this tumor is conjunctival adenoid tissue which does not differ from the norm.

It seems to me very difficult to classify this tumor. There seems to be no doubt that it is in the main an epithelial tumor, but it has certain peculiarities which I have never previously met with. Neither can I find an exact analogue in the literature at my disposal, although Parsons says that it is common to find cysts in nævi.

The practical question, whether this tumor is of a benign or a malignant character, cannot well be answered. The large amount of infiltration, however, renders it suspicious of malignancy, although it seems to be confined purely to the invaded tissue and not to reach, at least in my sections, into the surroundings, especially not in the direction of the growth of the newformation, that is, into the depth. The similarity of its appearance where the surface to that of a nævus might prove it to be a congenital tumor, even though the patient had noticed it only for about a year. In fact, after a careful study of it I am inclined to look upon this peculiar little tumor as a degenerating epithelial nævus, although just exactly such a tumor does not seem to have as yet been described.

CONTRIBUTION TO THE STUDY OF HÆMORRHAGIC RETINITIS, ESPECIALLY ITS ÆTIOLOGY AND PROGNOSIS.*

By Dr. Marc Amsler.

Introduction.—Among the ocular complications the appearance of which is often bad for the prognosis, we must cite in the first place the hæmorrhages in the background of the eye, which are so interesting from more than one standpoint.

In this study and in the statistics on which it is based we have collected all cases of retinal hæmorrhage in which the extravasation of blood was the main and predominant symptom and was due to a pre-existing pathological condition of the bloodvessels of the retina.

We employ the term "retinitis hæmorrhagica" simply because it is handy. We know very well that not all of the retinal blood extravasations to which we here refer need necessarily be accompanied by an inflammation of the retinal tissue. Practice, however, has shown ns, that it is very difficult to trace this line between the cases in which there is ophthalmoscopically no such inflammation present and those in which its manifestations cannot be doubted, especially a marked hyperæmia of the optic papilla. This difficulty is recognized by most of those who have written on this subject.

How frequent is hæmorrhagic retinitis? Is there a predisposition in age or sex? What does the ophthalmoscope usually show? And above all, can patients afflicted with it be cured, or are they doomed by fate to lose more or less completely the eye or eyes so diseased? If both these results are met with in practice in what proportion are the cure or improvement or, on the contrary, an aggravation of the hæmorrhagic retinitis observed? What conditions favor the first and of what kind are those which make us fear the second?

In searching for an answer to these questions we have collected the statistics of 164 cases of hæmorrhagic retinitis from the private practice of Professor Eperon in about thirty years and in his clinical hospital service of about five years.

General considerations.—(1) *Frequency.*—The 164 cases have been noted in a total of about 40,000 patients. In other terms out of 1,000 patients consulting an oculist 4 are afflicted with retinal hæmorrhage.

* Clinique Ophtalmologique, May, 1916.

What, on the other hand, is the frequency of this affection not in the practice of the specialist, but coming on as a complication in the course of different diseases in the hospital service of internal medicine?

The comparison of these two figures would certainly not lack interest. Unfortunately this study has not yet been made.

(2) *Sex.*—We find in our statistics 104 women and 60 men, that is 63.5 per cent. of women and 36.5 per cent. of men. There is a very great difference between the sexes. There is a predisposition of the female sex which even our later researches as to the ætiology of hæmorrhagic retinitis will explain but imperfectly.

(3) *Circulation.*—The predilection of sclerotic lesions for the cerebral arteries is well known. The retinal vessels are nothing else but cerebral vessels in which the ophthalmoscope shows the first beginnings of the affection. Farther on we will see the significance of these facts in the prognosis of retinal hæmorrhages.

We incline to the belief that our proportion of 55 per cent. would be still much larger if, in every case of retinitis hæmorrhagica, arteriosclerosis would be looked for, especially by measuring the blood pressure.

However that may be, it seems to us that arteriosclerosis is the principal cause of hæmorrhagic retinitis.

Cardiopathies (valvular lesions, myocarditis, etc.) are mentioned as ætiological factor in 8 per cent. of the cases in our statistics, however, without local changes in the vessels of the eye.

Albuminuria is the cause in 7.5 per cent. of our cases. This does not refer to the hæmorrhagic form of albuminuric retinitis. In most cases observed by us the albuminuria is probably only a symptom of a more or less localized renal arteriosclerosis.

Glycosuria, on the contrary, seems to us to be of much less importance. We find it mentioned in our series 4 or 5 times (2 to 3 per cent.). Retinitis diabetica is not always accompanied by hæmorrhages.

The menopause must be mentioned in the ætiology for hæmorrhagic retinitis. In 6 per cent. of our observations we have found no other cause than the vasomotor symptoms of this critical age the nature and pathogeny of which are still so little known.

The same incertitude exists concerning arthritismus, gout,

obesity, which play an ætiological rôle in about 5 per cent. of our patients.

Leber describes as a rare occurrence hæmorrhagic retinitis during pregnancy without renal complication. The number of our cases is too limited to speak of. At any rate, however, we can state that pregnancy seems to produce more particularly preretinal hæmorrhages.

As regards infectious diseases, acute or especially chronic ones, they will occupy us a little longer.

Hæmorrhagic retinitis may complicate influenza. We have collected 4 such cases in our statistics, all four of them one-sided, as Leber has stated.

The question of tuberculosis being an ætiologic factor in hæmorrhagic retinitis is just now under discussion.

Since von Michel, in 1890, incidentally reported such an occurrence, it has been well known that very late tuberculous lesions in the eye, for instance, in the ciliary body, manifest themselves by hæmorrhages. This is, however, not at all astonishing.

But we have come to suspect the action of the bacillus of Koch in a very special manner in hæmorrhages of the background of the eye the ætiology of which has thus far been obscure; these are the recurrent hæmorrhages of adolescents which often come on without any warning, as a rule, breaking into the vitreous body, and whose retinal origin is almost certain. Axenfeld and Stock as the first have established and confirmed this new idea at the Congress at Naples in 1909, and several years later in a very remarkable article. The spontaneous hæmorrhages of adolescents often occur in tuberculous individuals, even in the absence of any tuberculous lesions in the neighborhood (choroid, ciliary body, etc.). These tuberculous patients have a tubercular retinal periphlebitis which can be recognized by means of the ophthalmoscope in the form of whitish yellow foci situated along the veins. This may be due to the direct action of the Koch bacillus on the walls of the bloodvessels or to the indirect action of its toxins. This question is as yet unsettled. Yet, we can nevertheless uphold that there is a hæmorrhagic form of ocular tuberculosis.

It was Fleischer who brought forth the anatomical proof of the hypothesis of Axenfeld and Stock. This author showed in 1914 the existence of a tubercular disseminated periphlebitis in the retina (typical tubercles with giant cells, obliterating endo-

phlebitis, caseation) as the possible cause of hæmorrhages. The fact that Fleischer has not found any bacilli of Koch in these periphlebitic foci is not sufficient to render the tubercular nature of these lesions doubtful.

In discussing the pathology of these hæmorrhages, it seems to us right to mention the work of Chalier, published in 1914, on the hæmolytic action of the bacillus of Koch and the relations between tuberculosis and the anæmic syndrome. It is well known that hæmorrhagic retinitis is not exceptional in cases of anæmia, especially in cases of pernicious anæmia. Chalier has shown that in tuberculosis there is a generally latent hæmolytic state* which may grow worse till it actually produces a pernicious anæmia.

Syphilis causes a special form of retinitis analogous to what is called "simple retinitis," in which, however, hæmorrhages are not exceptional.

There remain still a few words to be said about the occasional causes of hæmorrhagic retinitis.

Not very rarely a hæmorrhage is caused by a sudden venous stasis as produced by a cough, vomiting and defecation. Thus we explain at least the frequent mention of "bronchitis," "dyspepsia" and "constipation" in our tables.

Do we go too far in admitting a similar rôle to blowing the nose, to sneezing and to blowing the cornet?

Finally two of our patients were attacked by hæmorrhagic retinitis after working for a long time with the head hanging down (for instance, in cutting grapes).

It is a curious fact that out of 45 of our patients which were improved or cured 38 are women and only 7 men. In percentage (84.4 per cent. and 15.6 per cent.) and compared with our researches as to the frequency of hæmorrhagic retinitis in the two sexes, these figures show that this affection is much more benign in women than in men. In order to explain this particularity we think: (*a*) In men, of the frequency of a certain degree of weakening of the "terrain", of the faculties of resistance and repair by, on the one hand, the troubles of the fight for existence and, on the other hand, by a bad alimentary hygiene (unacknowledged but widely spread abuse of alkohol and tobacco). (*b*) In women, of the importance of the genital apparatus and its

*This hæmoloytic action does not seem to be the exclusive property of the bacillus of Koch; a streptococcic infection and, perhaps, others (bacillus of Pfeiffer) may, also, produce it at least in certain individuals. It is probably a question of soil.

circulatory phænomena. Our tables show us, in fact, that the prognosis of hæmorrhagic retinitis in woman is favorable, especially between 40 and 60 years; the cases coming on during the menopause are in general benign; in proof of this we had 8 cases of this kind, 6 of which were considerably improved (complete cure in 2 cases), one remained stationary and a single one got worse. But this last case was afflicted, also, with obesity and bronchitis.

In closing this chapter we want to draw attention to the slowness of such improvement or cure, three months, six months and one year elapsing before the maximum has been obtained.

Stationary cases or those getting worse.—Which are the factors which can cause the fear of aggravation of a hæmorrhagic retinitis?

The male sex, on account of the reasons given above.

Then, advanced age: our statistics show that most patients whose condition grew worse were past sixty years of age. In fact, we know how much slower in advanced age are the processes of absorption and reparation. We may mention a remarkable exception to this general rule: A woman, 81 years of age, was afflicted with one-sided hæmorrhagic retinitis and was completely cured in one year.

As a further unfavorable factor we may cite the premature arteriosclerosis coming on in men of forty, aided by alkoholism and probably, also, by the abuse of tobacco.

In the ætiology of these aggravated cases we note often overwork, fatigue, general weakness, cachexia, bad hygiene, rich food causing arthritism, finally in rare cases glycosuria.

The ophthalmoscopic lesions which give a dark outlook are, after neuroretinitic atrophy, thrombosis of the central vein, and big ecchymoses occupying the whole backgound of the eye without thrombosis.

Relapses are not very rare. Since they happen often late (1 to 2 years, even 11 years after the improvement), and since some of our observations have not been sufficiently prolonged, we think that our proportion of 6 per cent. is below the reality. Most of these relapsing cases are due to arteriosclerosis.

In arteriosclerotic patients the hæmorrhagic retinitis assumes a very great significance as to the prognosis *quoad vitam*.

Straub, based on the statistics of 15 cases of retinitis hæmorrhagica from retinal arteriosclerosis, gives for this affection a mortality from cerebral apoplexy of 40 per cent. He points out

the predominance of these cerebral accidents in men, a fact which we can confirm.

Geis, from much larger and more complete statistics concerning this point than ours, has affirmed in a study, published in 1911, that the sclerosis of the retinal arteries, a frequent cause of retinal hæmorrhages, must make us fear a cerebral apoplexy and that every retinal hæmorrhage accompanied by increased tension has a bad prognosis.

Treatment.—Of the general treatment, really the most important, because it aims at the primary cause of the evil, we shall say nothing. It is directed against the arteriosclerosis or against albuminuria, or the anæmia, according to the ætiology which has been established. We cannot enter into the details of the different medicines, and we have nothing to add to what the classic treatises say.*

It does not seem that local therapeutic agents have a great influence on the absorption of the hæmorrhages and the repair of the lesions which they may have produced. Theoretically the withdrawal of blood by repeated applications of natural or artificial leeches, especially to the mastoid apophysis, should favorably influence the intraocular circulation, and in practice we may perhaps have the greatest confidence in these repeated applications. Even a general bleeding may perhaps be recommended to these patients with a high blood pressure.

In the same way, although much less forcibly and slower, the "revulsives" act which are employed in the form of iodine applications; they may at the same time exert some absorbent action.

Subconjunctival injections (bichloride, sodium chloride, potassium iodide) do not seem to accelerate the disappearance of hæmorrhages in the retina. We may say the same of instillations of dionin, which has an analogous physiological effect. Yet, since these remedies are without danger there is no objection to their methodical use.

Miotics, also, have probably no absorbing effect in these cases. They can, however, be recommended on account of their antiglaucomatous action. This danger of glaucoma contraindicates mydriatics even when the retinal hæmorrhage is complicated with iridocyclitis, as is, however, very rarely the case.

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*Among the internal remedies employed against hæmorrhagic retinitis we may mention thyroidin, for a long time dwelled upon by the American oculists, only lately recommended again by Best (*C. Bl. f. prak. Augenhlk.*, August, 1909). Its efficacy is perhaps due to the small quantity of iodine which it contains. Should this efficacy be a specific one in the retinal hæmorrhages of the menopause? This suggests some interesting experiments.

Finally, what we can count on the most for the improvement and cure not only of hæmorrhagic retinitis, but, also, of the general disease causing it, is a strict hygiene: oftenest milk and vegetable food with abstention from all alkoholic drinks; physical and moral rest, without excluding some moderate exercise; avoidance of all effort and stooping position; abstention from all tiring and prolonged eye work; tinted glasses, watchfulness regarding the intestinal functions and the circulation of the extremities. Unfortunately, for different reasons which vary according to the patient, it is mostly very difficult for the physician to obtain these things.

Conclusions.—Hæmorrhagic retinitis, a relatively rare affection (4 per thousand), is seen in multiple form with the ophthalmoscope.

It appears usually between 50 and 70 years of age, and oftener in women than in men.

It is usually unilateral and affects the diseased eye only.

Hæmorrhagic retinitis is usually a manifestation of a general disease.

In more than half the cases it is due to arteriosclerosis.

In the ætiology of the other cases we find cardiopathies, albuminuria and glycosuria, arthritismus and obesity, the menopause and, more rarely, influenza.

The hæmorrhage is frequently produced by an effort of some kind.

In 40 per cent. the prognosis of hæmorrhagic retinitis is good. As favorable conditions we may mention: The female sex, especially between 45 and 60 years (menopause); preretinal hæmorrhages, hæmorrhagic retinitis in a strict sense, peripapillary hæmorrhages in small numbers; a good hygiene, especially alimentary; finally appropriate treatment.

The prognosis is bad in 60 per cent. of the cases. Among the unfavorable conditions we may mention: The male sex, advanced age, premature arteriosclerosis; fatigue, overwork, general weakness; in one word, bad general condition and defective hygiene.

The appearance of hæmorrhagic retinitis in a patient with arteriosclerosis must arouse the fear of a cerebral apoplexy.

Thrombosis of the central vein is less rare than it is thought to be (1:2000). We do not believe that it invariably has a bad prognosis.

The treatment of hæmorrhagic retinitis, although of little effect in general, has undeniably a very marked influence on the healing in the cases with a favorable prognosis.

PARASPECIFIC SERUM THERAPY BY MOUTH IN EYE INFECTIONS.*

By Dr. L. Frozier,
Chief of Dr. Darier's Clinic.

After Roux's discovery his serum was soon used in different non-diphtheritic affections. In 1901 Talamon made with success subcutaneous injections of antidiphtheritic serum in cases of pneumonia.

Other clinicians confirmed the happy effect in non-diphtheritic angina, and even in other non-diphtheritic affections without angina in which the localization of the disease was in quite diverse places: typhoid fever, septicæmia, pneumonia, etc.

We might, therefore, think that the same might be the case with ocular non-diphtheritic infections. In 1903 already Dr. Darier treated the infectious eye diseases with injections of Roux's anti-diphtheritic serum. He experienced a favorable influence from the anti-diphtheritic serum no matter what the infectious agent was, and he thought that we might add to the great law of Pasteur concerning the specificity of sera: that, aside from their specific action, the sera possess the faculty of furnishing the organism invaded by any infectious agent with elements of defense which enable it to resist the infection up to a certain point.

Since then a number of observations have been published with very satisfactory results (infectious corneal ulcer, traumatic infection, iritis, post-operative infection). But the observers have always used serotherapy by subcutaneous injections, exposing their patients to serum affections of more or less gravity.

Empirically we could try another way of introducing the serum. The way by mouth was thought to lend itself very well to this new mode of administration, and the results were more than favorable. Clinically this paraspecific serotherapy by mouth became a new therapeutic agent. Now, the experiences made in the laboratory prove its efficacity experimentally.

This anti-infectious physiological therapy by mouth has the immense advantage of not offering any danger, and it perfectly prevents the serum affections which form the bad side of serotherapy, which, however, will remain the therapeutic desideratum in all cases of grave infectious disease.

We have always used the anti-diphtheritic serum of the Pas-

*La Clinique Ophtalmologique, June, 1916.

teur Institute. Its preparation offers all the guarantees; it can be found everywhere and is therefore easily procured by the physician. In ocular infections one must act quickly in order to combat the destructive processes in the quickest possible way to avoid incurable corneal opacities or the propagation of the infections to the deeper parts.

Mode of action of the paraspecific serotherapy.—The microbic specificity is not an indispensible condition for therapeutic action.

Therapeutic experimentation has proven that, aside from their absolutely specific immunizing action, the sera possess a very marked weakening force on infections other than those against which they are prepared.

According to Darier, this heterovalent, heterodox or paraspecific serotherapy could be explained in this manner, "When a young and absolutely healthy animal has been actively immunized against a toxin as virulent and as violent as the diphtherotoxin or the tetanotoxin, all the anatomical elements, fluids and cells, so to speak, rear up for the defense, spreading in abundance into the circulatory stream, each according to its power, antibodies, antitoxins, immunizing bacteriolysins and other defensive elements which we do not yet know."

"The glandular elements, liver, spleen, lymphatic, thyroid, suprarenal, testicular, etc., glands, as well as the nervous, muscular and bony tissues, are in a state of organic hyperactivity, and we understand readily that the serum of such an animal is very rich in hormons and defensive elements of all kinds, which, injected into a patient attacked by any infectious disease, will help to overcome this infection without having to invoke in reality a specific antitoxic action."

All these defensive elements are found in the normal serum of the horse, the sheep, and of other animals; but it has been clinically demonstrated that if the normal serum has an equal action on hæmorrhagic diatheses it acts quite differently in infectious diseases. "Clinically, an activated serum contains a greater quantity of lecithinic bases, as cholin, neurin, neuridin, creatinin," which according to Viquerat, of Lausanne, are the chemical defenses which combat the microbic intoxications.

A specific serum like that of diphtheria will have a greater chance of success in a diphtheritic affection, but it shows itself equally active in infections of a different nature. Its acts by favoring phagocytosis and by carrying to the very seat of the lesion the antibodies of the general defense. We can, therefore,

consider the paraspecific serotherapy as a very important new therapeutic method which increases the means of general defense of the organism in all general and local infections.

Why the way by mouth? Advantages of this new method. Mode of application.—Since injections of antidiphtheritic serum have become a general practice in therapeutics, is has been shown that one injection of serum may provoke more or less grave affections, to which the name of "serum disease" has been given, and that such graver affections were more frequent after a second injection of serum given sooner or later after the first one.

During his beautiful researches which led to the discovery of anaphylaxis, Professor Richet has shown that the serum of the horse, cow's milk and a number of other products which have the common character of belonging to the albumenoids, although free from all toxicity are prone to produce the anaphylactic state.

In order to show this power to produce anaphylaxis it was sufficient "to introduce these substances into the organism of an animal of another species by the parenteric route (by intravenous or subcutaneous or peritoneal injections) in such a manner that they were prevented from undergoing the transformation which the digestive juices would make them undergo in the intestinal tract."

We may, therefore, formulate this law: "Every albuminoid substance coming from an animal of another species introduced into the interior without previously having undergone the changes which are necessary to make it assimilable, acts as an anaphylactic poison."

That is, the presence in the interior of an unassimilable albumenoid causes a reaction which brings forth another new product (sensibilisin of Besredka, toxigenin of Richet) which causes more or less grave affections, called serum disease, seric accidents, anaphylaxis.

These more or less serious "seric accidents," eruptions, increase of the temperature, albuminuria, arthralgia, œdema are quite frequent. In certain series of injections they have been observed in up to 35 per cent. (Guinon.)

Aviragnet and Hallé have reported four cases of hæmorrhagic necrosis and gangrene of the abdominal wall in reinjected children.

Gillette of New York (*Therap. Gaz.*, March 15th, 1910) has been able to collect 28 cases in which death (16 cases) or a grave

collapse (12 cases) followed an injection of antidiptheritic serum.

In 1908 the *Journal of the American Medical Association* published several cases of death or collapse.

Allard (*Deutsche med. Wochenschr.*, 1911, p. 667) relates the observations of two colleagues showing grave accidents of anaphylaxis after serum injections.

It is clear from the preceding that serum injections are far from being inoffensive.

It is, therefore, wise to be reserved in their use, not to employ them except for good reasons in grave cases in which rapid action is required, and to save them especially for specific injections against an infectious germ for which this serum was prepared especially.

Thus the general use of sera in paraspecific serotherapy, a therapy which we employ in the most diverse ocular infections, could, in view of the great number of such injections, give us a large number of more or less serious serum accidents, like those related above, and if on the same patient who to-day is treated for an eye infection, we should after an undetermined lapse of time be forced to make, for instance, for an attack of diphtheria, other serum injections, we will undoubtedly produce in this hypersensitized organism serious symptoms of anaphylaxis.

Of course many attempts have been made to avoid these serum accidents, these phænomena of anaphylaxis.

It has been recommended to use only a serum at least three months old, a serum several times heated to 56 degrees, giving calcium chloride; it has also been advised to practice injections of smaller doses.

If the patient has had previous injections made, we must, in the hours preceding the massive injections, make first some small injections and then greater and greater ones. (This is the anti-anaphylaxis of Beredski.)

The Professors T. Carnot and Slavu have shown that the addition of 3.3 per cent. of hydrochloric acid to the horse serum is sufficient to prevent anaphylactic accidents without altering the properties of the serum.

Lesné and Dreyfus have shown that pepsin and pancreatique juice (but not gastric juice) suppress the anaphylactic power of the albuminoids.

The direct injection of albumen into the stomach and the small intestine does not cause anaphylaxis, while such an injection into the large intestine does.

It is well, then, in practice to keep in mind, as Léri states, that the digestive ferments render the albumins incapable of producing anaphylaxis.

We see, therefore, the great importance of this fact, that if we give a serum by mouth, its albumins are modified by the action of the pepsin, the pancreatic juice, the digestive ferments, and we should have no serum affections.

In fact, in the eight years since the administration of antidiphtheritic serum has been practiced at the clinic of Dr. Darier, in the most varied ocular infections, I have not observed a single case of serum disease. Dr. Paton (*New Serum Therapy*, London, 1906), who has employed this serotherapy by mouth in a multitude of diverse infections, in his work, speaks of no case during a period of 9 years (1898 to 1906).

All other experimenters who have employed serotherapy by mouth have nothing but praise for this new method of using serum, and in their numerous observations relate not a single case of serum disease.

Professor Spiess, of Frankfurt (*Deutsche med. Wochenschr.*, February, 1912), gives the serum by mouth in one dose of 25 cc. By this means he obtains, in affections due to the streptococcus, astonishing therapeutic results without ever having had any serum affection except now and then a small rise in temperature followed by an abundant and salutary transpiration.

In ocular affections it is, generally, difficult to make patients submit to injections of antidiphtheritic serum. At present the physicians are still doubtful of serotherapy, although it has such a powerful action in all infections.

Now, however, since it is proven clinically and experimentally (as we shall show presently) that antimicrobic sera taken by mouth exert a retarding and curative action, the more marked the greater the ingested dose, and the oftener repeated, we shall use the serotherapy by mouth, which is much more practical than per rectum, which, as we know, more often exposes the patient to serum affections, to anaphylaxis.

In an acute eye affection it is most important to stop the progress of the disease before it has caused irreparable damage.

It is often difficult to quickly recognize the exact nature of the infection, and precious time may be lost in bacteriologic researches which are often quite complex.

In awaiting the results of such researches, which should never be neglected, it is fortunate that we can boost the patient's

natural defenses by some help taken from another organism. In the beginning of the infection, when no deep intoxication has as yet developed, but little will suffice to awake the vital resistance of all the tissues. The defensive elements are found in the normal serum of animals, or better yet in the activated serum. It is, therefore, the duty of the physician to make the patient take some antimicrobic serum which he can get easily (the antidiphtheric serum is the easiest to obtain). The method of employment by mouth is so simple, so agreeable to the patient that it can be prescribed even before there is any indication for an injection and, if the action is insufficient, the dosis can be doubled without inconvenience.

Moreover, this method of administering the serum by mouth has the immense advantage that it permits the simultaneous application of all local medication (instillation of collyria, subconjunctival injections, cauterization, etc.), for aside from the paraspecific serotherapy no therapeutic means must be neglected which we have at our disposal.

We prescribe a potion composed as follows:

Antidiphtheritic serum	10 grams
Raspberry syrup	30 grams
Aqua	100 grams

A tablespoon to be taken every hour for the first 3 days, and the following days (for a week at least) every 2 hours.

The effects of the paraspecific therapy by mouth will not fail to show themselves; stimulated by this medication, which is a form of transfusion of a hyperactivated serum, the organism will react energetically, often the infectious process is stopped, the patient reports a reduction, even the disappearance of the pain, and an increased strength, appetite and sleep. Thus precious time will have been gained, and if a cure is not established the specific serum or vaccine can be employed with accuracy, since by that time the bacteriologic examination will have been able to furnish a precise diagnosis.

Experimental researches on the efficacy of sera given by mouth.—Until lately we were lacking the experimental proof of the efficacy of sera when taken by mouth. All published observations were purely clinically empirical and they could well be accused of not having been proven by laboratory experiences on animals.

Yet, in all acute infections of the eye, very often one observes

as the first action of Roux's serum the more or less complete cessation of the pain; and this cessation comes on the quicker the prompter the serum has been absorbed.

"Directly injected into the veins," says Darier, "the serum will bring on a cessation of the pain within an hour; injected under the skin this effect will be reached only in three or four hours; finally if the serum is simply given to drink, the cessation of the pain may not be observed until six or eight hours later."

This simple clinical observation often made has the full value of a laboratory experiment; the more rapid the absorption of the serum the more promptly the cessation of the pain will be observed. It is true, therefore, that the taking of the serum by mouth is slower in its action than when it is injected; but it acts, on the other hand, without causing any serum affection and without hypersensitizing the individual.

Professor Ruppel, of Frankfurt, at the instigation of Spiess, made a series of very interesting experiments by which he demonstrated the efficacy of serotherapy by mouth. According to his experience it will be necessary to give large doses of serum and very soon after the infection in order to obtain positive results.

These experiments are clear and instructive because they demonstrate the efficacy of serotherapy by mouth.

In order to control this action of serum taken by mouth Dr. Solm, of Frankfurt, has repeated Ruppel's experiment, and in a paper, read at the meeting of the Ophthalmological Society of Heidelberg, he concluded that in rabbits into whose stomach he had introduced 25 to 30 cc. of serum by means of a sound, he had cured infections of medium intensity, which did not happen when the animals received the serum by parenteric injection.

Eight hours after the serum had been taken by mouth he found antibodies in the blood; eighteen hours later they had disappeared.

These conclusive experiments repeated on numerous animals call for no commentary.

We no longer lack that experimental proof of the efficacy of serotherapy by way of the mouth.

It is seen that, even when administered through the stomach, the serum possesses at the same time an immunizing and a curative power, and the fact that it is proven that the serotherapy by mouth has the same effect as by injection, is very important. For in all acute eye infections we can now without fear employ

the serotherapy by mouth, because we know by experiment and by clinical experience that we shall have the same favorable results as with injections without their annoyances.

On the influence of paraspecific serotherapy by mouth on the development of eye infections (antidiphtheritic serum of Roux.)—The numerous observations published in literature concerning the serotherapy by injections have shown us in an irrefutable manner that the antidiphtheritic serum is a precious aid in ophthalmology; that this paraspecific, heterodox serotherapy excites the defensive forces of the organism, increases the phagocytic power of the leukocytes, and brings the antibodies to the very seat of the lesion for the general defense.

To-day, we want to demonstrate that the paraspecific serotherapy by mouth has exactly the same effects as that by injection, namely, removal of the pain, absorption of exudations, arrest of infectious process. This is what we observe in our patients after the absorption of serum.

Whoever, in his first attempt with serotherapy by mouth, sees a grave iridocyclitis improved a few hours after the absorption of serum, is likely to be inclined to employ this therapy with too much enthusiasm. For we must not see an infallible panacea in this paraspecific serotherapy. It is a powerful aid to the defensive forces of all tissues, a powerful tonic which will help the organism to resist the progress of the infection; if the latter is, however, too far advanced or too virulent, especially if there is already an infection of the vitreous body, nothing can stop it—this must not be forgotten.

Clinical study.—In pseudo-membranous conjunctivitis which has a varying ætiology (Weeks' bacillus, gonococcus, pneumococcus, staphylococcus, alone, or in combination with others) serotherapy by mouth has a favorable effect on the pathological process. If there are advanced corneal lesions it may arrest the necrotic process; but if the cornea is perforated the serotherapy acts only indirectly on the lesions by re-establishing the normal nutrition in the tissues.

Can we expect from this new treatment an effect so certain that we are authorized to employ it in preference to all other therapeutic agents in infectious ulcers of the cornea, which must be dreaded as a complication in even the slightest corneal injuries? This is asking too much. Paraspecific serotherapy cannot replace everything, yet it is a powerful aid, a general stimulant being of very efficacious therapeutic help to the local treatment (toxic, chemical, galvanocautery, operation).

It is not any too much to combine all these means in order to cure a grave ulcer of the cornea. But, before everything else, we must give a potion of 10 cc. of serum in 24 hours and keep this up for 8 consecutive days. The action of the serum is readily recognized by a very marked state of euphoria from the very beginning, which permits the patient, who for several nights has not slept, to sleep through the whole night after the first dose of serum. The following morning the patient states that his sufferings have been greatly relieved, he opens the eye more easily and can stand the light better. When the action of the serum is continued the defensive forces of the organism are stimulated and with the aid of other therapeutic measures the desired result, a cure, is reached; to be sure with a leukoma, but with a leukoma less extensive and much more transparent and better vision than with any other therapy.

Optochin in the pneumococcic ulcers seems to have a really abortive specific action; it might, perhaps, be advantageously combined with the paraspecific serotherapy.

As much as the effect of serotherapy on the cornea has been contested by numerous authors, the reports concerning its powerful action in iritis *cum hypopyo* and in very violent and painful plastic iritis are unanimous. There is no better occasion to study the action of paraspecific serotherapy by mouth than in infections of the iris.

The process is perfectly visible although we cannot act on it directly by any topic; only atropin and dionin have any effect on the iris. But, when these two remedial agents have remained for several days without any effect on the pupil and the violent pains, we can convince ourselves in a little while of the powerful action of the serum for several hours after the serum medication; usually after the sixth or seventh spoonful of the potion, the pains commence to get less, then they gradually disappear completely, the patient sleeps the whole night through, a thing he had not been able to do for several days. The next day the eye is less red, less swollen, moves easier. The pupil gives way little by little to the atropin, the exudation in the anterior chamber is rapidly absorbed, and in four or five days we feel that a cure is near. But this is only an apparent cure because only the inflammatory symptoms are improved. When they are quieted the primary cause of the disease must be attacked: mercury or arsenic in syphilis; sodium salicylate or aspirin in rheumatism; tuberculin in tuberculosis; collargol or antigonococcic vaccine in a blennorrhagic infection.

In the treatment or in the prophylaxis of infections through a perforating wound of the cornea and sclerotic, the observers are almost unanimous in recognizing the powerful action of serotherapy, at least if the application is made early and in big dose. When once suppuration is seen in the vitreous body nothing can prevent the loss of the eye; but yet, thanks to the serotherapy, we can almost always quiet the pains, prevent a phlegmone of the eye and avoid the enucleation or evisceration.

In every case in which an infection of the vitreous body is feared the serotherapy must be intensive, early and supported by all the other therapeutic means which we have at our disposal.

Post-operative infections.—Where, however, the paraspecific serotherapy shows powerful action, nearly as clearly as in laboratory experiment, is in infections which may come on after a cataract extraction. In such a case we know the exact day of infection, and from hour to hour we can follow the progress of the infectious humor, purulent deposits on the iris, on the lens, in the anterior chamber; at the same time we note the subjective symptoms complained of by the patient. The observer can therefore find out the effects produced by the serotherapy.

What he will note first is the most marked subjective improvement, the patient feels a considerable change for the better in from 6 to 7 hours after having taken the serum by mouth.

The next day only the physical signs of the infection are improved, the eyes are spontaneously opened, stand the light better, the lids are less œdematous, the grayish infiltration of the corneal wound assumes a more shining aspect, the pupil can be seen through the less turbulent aqueous humor, the exudations into the pupillary area diminish, and the atropin mydriasis begins to develop, the hypopyon grows less and then disappears.

In general, if the infection has been attacked at its beginning, the prognosis will become favorable in from four to eight days; at the end of a month vision may be found to be about the same as a normal operation.

If the infection is very serious, already too far advanced, when the serotherapy is employed, the result is not so certain. We must make use of all our other remedies in conjunction with it. But, even then, the paraspecific serotherapy will still be useful by furnishing the exhausted organism with elements of defense which will improve the general condition of the patient by aiding the local reaction.

However, when once the infection is deeply established in the vitreous body, serotherapy can no more than all our other means assist the infectious process and there is no hope of saving the eye. Yet, the eyes which have been saved from a post-operative infection by paraspecific serotherapy are already quite numerous.

Under all circumstances, none of the therapeutic agents used heretofore has given as rapid and constant results with absolutely no risk, since it is experimentally proven, as well as clinically, the Roux serum taken by mouth provokes exactly the same therapeutic effects as the serotherapy by the subcutaneous route, but the serum must be given for several days in the dose of 10 cc. in 24 hours. In war injuries we cannot recommend too strongly the injections of antitetanic serum, which exerts a specific action to prevent tetanus and to help the general defense.

Conclusions.—It has been tried to arrest an infectious process by serotherapy by combatting determined microbes with specific sera. Then, after some observers had seen the good effects of antidiphtheritic serum in infections not due to the Loeffler bacillus (streptococcus, pneumococcus, staphylococcus), we have come to use this paraspecific serotherapy in all eye infections.

1. For us paraspecific serotherapy is a powerful stimulant of the vital energy of the whole organism which permits it to resist more easily the infectious agents.

2. In a certain way this constitutes a serum optotherapy of defense, furnishing to the sick organism a serum charged with elements of defense, elaborated by healthy animals which have been submitted to an intensive immunizing treatment.

3. Paraspecific serotherapy will act the quicker and the stronger if it is used to combat as recent infection localized in a very much vascularized tissue, since the production of defensive antibodies there is accomplished with very great intensity.

4. The most constant result of paraspecific serotherapy is the rapid diminution of the pains, an analgesic and euphoric action.

5. The intravenous or subcutaneous injection would be the most certain way and the most scientific one of practicing paraspecific serotherapy, if the fear of serum diseases, which occur in very numerous cases, did not paralyze the physician's ardor and prevent him from using big enough doses and at the same time prompt the patient to refuse this kind of treatment.

6. By giving the serum by mouth all serum affections are avoided with certainty, and this administration can be continued for a number of days without damage.

7. A careful study of our personal observations and of those collected from the medical literature concerning serotherapy by mouth, shows that its use causes no danger whatever to the patient and that its action is as efficacious as that by subcutaneous injection.

8. From our experience we know that paraspecific serotherapy by mouth calms the pains, arrests the progress of the infection, helps absorption of exudates and the reparation of the tissues.

SYMPATHETIC OPHTHALMIA UNSUCCESSFULLY TREATED WITH ORGANIC ARSENIC COMPOUNDS.

Miller (*British Med. Jour.*, July 29, 1916) reports a case of sympathetic ophthalmia treated with organic arsenic compounds in which the result was a failure. The drugs used were hyposol and galyl. Whether these drugs are supposed to correspond to salvarsan and neosalvarsan or not is unkown to the reviewer. The right eye was injured by a fall on the curb, rupturing the sclera at the usual site, above and to the inner side of the cornea. Two months later sympathetic inflammation occurred in the left eye. The injured eye was enucleated. The arsenic compounds were given intravenously. Following one injection of galyl the patient was seized with syncope and was apparently dying. Later on was semi-delirious, noisy and restless. No improvement ensued after a number of injections. Medicines and mydriatics seemed to have no effect. The pupil was bound down and filled with exudate. The writer stated that his result did not appear to confirm the optimistic views as to the results of the use of arsenic compounds in the treatment of sympathetic ophthalmia. On the other hand, the treatment may have commenced too late. (It may also be true that hyposol and galyl are not acceptable and efficient substitutes for salvarsan, though too much reliance must not be placed in these drugs in the treatment of so desperate a condition as sympathetic ophthalmia.)

MEDICAL SOCIETIES.

THE PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

Stated Meeting, April 13, 1916.

Dr. Wm. Zentmayer, Chairman.

SYMPOSIUM ON "DISEASAS OF THE LACRIMAL ORGANS".

"The Anatomy and Physiology of the Lacrimal Apparatus."

Dr. W. W. Watson gave a brief review, referring especially to those anatomically predisposing factors that particularly lend to the development of obstruction in the lacrimal passage.

"The Ætiology of Stillicidium."

Dr. Wm. Zentmayer said that epiphora occurs when, either as the result of over-stimulation of the lacrimal secretory apparatus the flow of tears is in excess of the capacity of the drainage apparatus or where with normal or abnormal stimulation there is some abnormality of the lids or of the lacrimal passage.

Overstimulation may be either reflex or central. Psychical weeping is of central origin. Dr. J. C. Carpenter recorded a case of epiphora which was apparently due to an irritative central lesion of specific origin. The epiphora met with in exophthalmus, tabes, syringomelia, pregnancy, and migraine is probably reflex in origin; while that due to corneal and conjunctival irritation as is seen in foreign bodies and phylyctænular disease, also in refractive errors, as well as that occasionally met with in cataract, as pointed out by deSchweinitz, is typically reflex. In the latter instance it is probably, as deSchweinitz says, the result of the uveal disturbance which according to Risley is so frequently a causative factor in the production of cataract. Epiphora occurs when as the result of facial palsy winking is in abeyance or the lids are no longer in close relation with the globe, or where they fall away from the globe from loss of muscular tone in senility, or are drawn away by cicatricies in the neighborhood of the lids, or as the result of chronic inflammation of the skin of the lids, lid margins, conjunctiva, or as pointed out by Dewey, by maladjustment of nose-glasses of the "sure-on" type. Epiphora also occurs when there is obstruction in the lacrimal pass-

ages. This may be congenital or acquired. Congenital types are, absence of the puncta or canaliculi and atresia in the canal, usually at the lower third, or more frequently non-patency of the nasal end (Hasner's Valve). Acquired obstruction to the nasal passages arises from foreign bodies such as cilia, and fungoid growths as leptothrix, streptothrix, penicillium and actinomyces, or it may arise from burns or wounds, or from intranasal disease. Dr. Zentmayer then considered stenosis of the lacrimal duct, dacryocystitis, acute and chronic, and mucocele.

"The Conservative Treatment."

Dr. Samuel D. Risley (by invitation), in discussing the nature and management of affections of the lacrimal drainage system, urged the importance and relative value of conservative treatment. He regarded the reputation for chronicity of these affections as due in large measure to the violent methods of treatment to which they are often subjected. He was led to adopt this view by a study of the anatomical character of the nasal duct in a large number of skulls and wet preparations. The irregular surface of the bony duct, even in dried preparations, made it quite impossible to pass the large sized probes which had been employed by some surgeons in any of the skulls examined without fracture of some portion of the projecting walls of the duct, and in two specimens not even the smaller probes could be passed without injury. After these studies he lost the idea that the nasal duct was a drainage tube like a drain pipe. A more correct conception is that of an irregular fissure or slot-like passage for the tears, lined by mucous membrane. He pointed out that this mucous membrane duct is surrounded by a system of veins in health, like cavernous or erectile tissue, which when congested from any cause must compress the mucous duct and close its lumen more or less completely in any portions of its irregular surface, and in this manner cause a retention of tears. Dr. Risley said that this retention was a common experience in acute coryza and other systemic states causing œdema of the mucous membrane, e.g., auto-toxæmias, common "colds", etc. These considerations had many years ago led to the adoption of more conservative methods in the treatment of lacrimal obstruction, and clinical experience had soon demonstrated its greater value. The habitual employment of probes was soon abandoned and he has been able to give a more favorable prognosis. The discouraging cases were those who had been subjected to injury from forcible

introduction of probes. If, in the attempt to force a probe down to the floor of the nostril back of the inferior turbinate bone, the mucous membrane had been torn through and its surrounding congeries of blood vessels injured, the prospect of a permanent cure was remote. Dr. Risley thought that permanent strictures of the duct were likely to occur after such an accident, and the cases of chronic purulent and mucopurulent dacryocystitis likely to be seen as a sequel.

Dr. Risley's method in acute cases was, after the instillation of cocain, to dilate the inferior punctum and canaliculus with a dilator, which he had devised, and then with the fine canula of his lacrimal syringe irrigate the sac with an alkaline unirritating lotion. If the lotion passed through the nasal duct, the prospect of speedy recovery was good. If the lotion returned through the canaliculi into the conjunctival sac, a few drops of a solution of cocain and adrenalin were carried into the sac and allowed to remain for ten minutes, and a second trial made to force the solution through the nasal duct. Failing in this, an alkaline astringent wash was prescribed to be instilled into the conjunctival sac at intervals until the following day. The attempt to irrigate the duct was then repeated and was usually successful. If not, after thorough cocainization a cautious attempt was made to pass a No. 3 or No. 4 of the Bowman's series of probes, or a fine silver probe with a small bulbous extremity. If successful in this attempt, irrigation followed and the case recovered, often without any subsequent resort to probing. In long standing cases he had found that frequent irrigation with a wine colored solution of iodine was sufficient in sterilizing the sac and duct and through its stimulation to restore the parts to health. He recalled the former years when the clinic brought many cases daily who sat with Bowman's probes in their tear ducts, but said that now a visitor to his clinic would never discover a single example, and only rarely see the temporary passage of a probe.

"Operations for the Removal of the Sac."

Dr. Wm. Campbell Posey gave the details regarding the indications and method for the removal of the lacrimal sac. He said without complete local anæsthesia removal of the sac in toto was extremely difficult if not impossible. He injected the region about the sac freely with 9 parts of a 2 per cent. solution of novocain and 1 part of a solution of 1 to 3000 of adrenalin.

Dr. Posey advocated Meller's method, but said that he did not

think this operator laid sufficient stress on the palpebral ligament as a land mark for the location of the sac. Finding the teeth of the Meller speculum liable to cause injury to the cornea in the event of the instrument slipping, he had substituted blunt hooks. In order to avoid leaving any suppurating mucous membrane, Dr. Posey advised the slitting of the canaliculus and the thorough curetting of the mucous membrane lining the tube in every instance. He had seen a disfiguring scar from the operation in only one instance out of the 75 or more removals of the sac he had performed. This was due to a keloid overgrowth of the lips of the wound.

While the obliteration of the sac permanently closes the lacrimal passage, the chief source of lacrimation in the case of lacrimal disease, i.e., the irritation of the mucous membrane by the retained muco-purulent discharges, is removed, so the lacrimation is slight and patients are usually grateful for the relief afforded.

Dr. Posey recommended the removal of the sac in all cases of mucocele, in all long standing inflammations of the mucous membranes of the sac and in all cases of lacrimal stricture where styles failed to give permanent relief.

DR. WALTER W. WATSON, Sec'y.

ABSTRACTS FROM MEDICAL LITERATURE.

BY W. F. HARDY, M.D.,
ST. LOUIS, MO.

GUNSHOT INJURIES TO THE EYES.

The war has produced a great deal of literature dealing with gunshot wounds. That relating to the eyes is less abundant than of gunshot wounds in general. Stock has an article in the *Bristol Med. Jour.*, December, 1915, dealing with eye injuries. Little time in his hospital was given to study a case or determine the prognosis. Shell shock is mentioned, and many of the cases of blindness from this cause get well rapidly. Stock is sceptical as to whether or not there is anything out of the ordinary in the cases who have developed defective vision after shell explosions.

Coarse lateral nystagmus not made worse on looking up, as in miners, was noted in a number of patients who had not had nystagmus before going to the front. They were mostly of a neurotic type with vision much affected. There was no indication of intracranial pressure or of cerebellar disease.

There was a class of cases where blows on the eye or surrounding bones were followed by defective vision. Some had errors of refraction, almost all hypermetropes. Others with no refractive error usually recovered full vision. In still other cases blows on the eye caused physical signs to persist, such as photophobia and lacrimation, subconjunctival hæmorrhage, keratitis, damage to iris and hyphæma, traumatic cataract, vitreous opacities, changes at the macula, ruptured choroid, papillœdema and optic atrophy. There was no definite plan about dealing with traumatic cataract. Most cases were not operated upon immediately, but postponed for later operation. Three cases of quadrantic scotoma due to wounds in the occipital region were noted, most of the cases of lacrimal obstruction were not due to injuries. In this conditions Stock found West's operation very satisfactory. The three things that struck the author most with regard to eye injuries was, firstly, the number of glancing wounds of the eyeball, which, while causing considerable damage to the eye, left untouched the surrounding soft parts; secondly, the frequency with which blows have brought to light, for the first time, quite marked degrees of hypermetropia; and thirdly, the number of men who acquired nystagmus as the result of head injuries.

This somber subject was not without a flash of humor. One case is recorded of a man, with a cut lower lid, who was much amused because a bullet smashed his eye, which happened to be a glass one.

HORSE HAIR SUTURE FOR THE RELIEF OF TENSION IN GLAUCOMA.

Smith, of Bloomington, Ill. (*Ill. Med. Jour.* September, 1916) offers as a suggestion the use of a horse hair seton for the relief of increased intraocular tension. He has experimented on rabbits but it does not appear that he has put his suggestion to the test in human beings. He mentions the fact that horse hair, being an animal tissue would probably be better borne by the eye than metallic or vegetable substances. A horse hair is cylindrical in shape, is quite smooth and is non-absorbable When used as a

seton it will retain its relative size and position in situ. It is suggested that the horse hair suture be used in the following manner: Use a sharp round straight needle armed with a small horse hair suture; introduce the point of the needle at the external equatorial region of the eyeball, 6 or 8 mm. from the limbus, through the conjunctiva and episcleral tissues, passing in the direction of the long axis of the globe to the limbus, thence through the aqueous chamber, making a counter puncture at the cornea scleral margin on the opposite side, bringing the needle out. Reintroduce the needle where it was withdrawn and follow along under the conjunctiva and episcleral tissues for 6 or 8 mm., bringing the needle out. Both ends of the suture are cut close to the conjunctiva, placing the retained ends beneath the membranes. The suture extends horizontally across the aqueous chamber in front of the iris about one-third of the distance from the circumference of the iris to its pupillary margin. Smith states that in acute glaucoma during the incubation or prodromal stage or indeed during the "glaucomatous attack," the horse hair suture might be used for the relief of the pressure symptoms while the excretory apparatus is still intact, and before the root of the iris is welded to the cornea.

THE ECONOMICAL USE OF SOLUTIONS OF COSTLY ALKALOIDS FOR OPHTHALMIC PURPOSES.

N. Bishop Harmon (*British Med. Jour.*, August 5, 1916) contributes a timely article on costly drug economy. In addition to economy there is the added feature of convenience and antisepsis. For the past four years Harmon has been using a stock "ophthalmic solvent". Small quantities of various solutions are made up as needed, using this stock solvent to dissolve the various alkaloidal salts. The solvent is made up as follows: Distilled water 1 pint, methyl salicylate 2 grains, oil of gaultheria 2 minims, Tr. iodine 2 minims. The mixture is well shaken, put in a stoppered bottle and allowed to stand for 48 hours, when it is ready for use. Different proportions of the drugs were tried but the above formula was found most satisfactory. The solvent has a marked odor, not unpleasant. When used in the eye there is a slightly increased sting, but not sufficient to bar its use. When desirous of doing away with the sting the solution may be heated in a sterilizer which results in the volatile preservatives being driven off. The economy in the use of the solvent is great.

Cocaine, for instance, which in solution rapidly develops moulds, keeps perfectly for long periods of time in the solvent. Even when exposed in wide-mouthed bottles in ordinary clinic practice the solutions remain sterile for a long time. More economical still are solutions of a firmer consistency so that they may be dropped from rods. Viscid solutions are kept in contact with the conjunctiva longer, are better absorbed and their effect consequently is maximal. Oil solutions are therefore of advantage, but as pure alkaloids of some drugs are very scarce oil cannot be used as the salts are not soluble in it. Harmon devised, therefore, a method of thickening solutions in stock solvent so as to fill all requirements by the addition of gum arabic in sufficient quantity so that a drop of full size would cling to a lacrimal probe. The mucilage is made eight times the normal strength. The solution is slightly turbid. Usually gummy solutions are good media for moulds, but this has not proved so when using the stock solvent. It was found that cocaine, atropine, eserine, homotropine and homatropine with cocaine are equally effective in this gummy solution, and the economy of their use is noteworthy.

A NEW METHOD OF EXTIRPATION OF THE LACRIMAL SAC WITHOUT RESULTANT SCAR.

Kearney (*Medical Record,* August 19, 1916) has devised a method of removal of the lacrimal sac without having a scar left. This feature he thinks will cause many patients to submit to an operation who would be deterred by the thought of a resultant scar. The sac is removed by way of the slit canaliculi. The indications are an annoying chronic dacryocystitis of either the catarrhal type, with regurgitation of mucoid secretion into the conjunctival cul-de-sac, or the recurrent phlegmonous type. It is possible to do this operation under local anæsthesia, but Kearney thinks ether anæsthesia is much to be preferred. The technic is as follows: The lacrimal sac is milked of its contents and the conjunctiva is flushed with a saturated solution of boric acid. A number one Bowman probe is passed through each canaliculus as far as the bony wall. A Weber knife is passed down the upper canaliculus making the usual Bowman slit. The lower one is done in like manner. A bridge of tissue between the two incisions is left. This is now severed with a bistoury. The anterior lacrimal crest is located and the internal canthal ligament is divided at its insertion here. The diseased sac and the sur-

rounding granulomatous tissue and the bone beneath when carious, are broken up with curettes and scraped out through the original incision. The walls of the canaliculi are scraped also. The cavity is cleaned and swabbed with a 1:500 bichloride of mercury solution. A pad of cotton wrung out of boric acid solution is placed over the area and a head bandage applied firmly to keep the walls opposed and to prevent swelling. The after treatment consists of cleansing the conjunctival sac and the removal of the bandage for 3 or 4 days. The advantages of the operation are said to be, (1) there is no scar remaining on the face; (2) there is less difficulty in obtaining consent to operate when no facial scar is assured; this is especially true of women; (3) there is much less hæmorrhage during the operation; (4) there is no possible return of the condition, because the mucous lining is ablated from the puncta to the upper portion of the nasal duct. As to results there is cessation of all sac secretion immediately after operation and epiphora diminishes gradually and finally ceases. A detailed account of fourteen cases is given, and the instruments used in the procedure are illustrated.

DIAGNOSTIC AND PROGNOSTIC VALUE OF VISUAL FIELDS WITH SOME SUGGESTIONS IN TECHNIQUE.

Suker (*Ill. Med. Jour.*, September, 1916) reviews the subject of perimetry and its significance, pointing out its value in diagnosis, prognosis and localization. His technique is elaborate and painstaking. The time element in carrying it out would no doubt be a hindrance. The different pathological conditions and the fields characteristic of them are taken up. Lastly is a consideration of the anopsias. The following are the principal factors in hemianopsia—especially tract hemianopsia. (1) The tract only may be affected. (2) The form of the hemianopic field alone does not indicate tract disease. (3) Homonymous hemianopsia, combined with failing vision in one eye with a corresponding change in the retained half of the visual field, the disease has already spread to the chiasm. (4) Nasal hemianopsia in one eye with blindness or high amblyopia in the other eye, then there is disease in the tract on same side as the hemianopsia. (5) Hemianopic loss of vision in one eye soon followed by a like loss in the other eye, indicates a lesion very near the chiasm. (6) Bilateral, incomplete homonymous hemianopic defects point to tract disease situated centrally at some distance from chiasm. (7)

Paresis or paralysis of one or more central nerves on one side, with homonymous visual halves on the other side of body, followed by or accompanied with hemiplegia or anæsthesia on same side as hemianopsia, indicates a disease of the tract, and often polyuria is associated with this condition. (8) Homonymous hemianopsia combined with hemianopic pupillary reaction points to tract involvement. (9) Slowly developing homonymous defects point to tract disease. (10) Sudden hemianopsia in an ordinarily healthy patient is often due to intra-cerebral hæmorrhages or emboli. (11) Hæmorrhages into the tract are mostly of a capillary type.

In the tract lesions we note the additional points. (a) Bilateral homonymous hemianopsia may arise from the monocular type. (b) The disease can attack the second tract after causing a homonymous hemianopsia in both eyes by affecting the first tract, thus causing a duplex homonymous hemianopsia. (c) The disease can spread from tract to chiasm—giving rise to temporal hemianopsias. (d) The disease may spread from chiasm to tract. This gives first temporal hemianopsia followed by complete blindness in one eye. This train of symptoms cannot be separated from that which appears when the disease spreads to the optic nerve of one side or when the whole of one side of the chiasm is complicated.

NEED OF CLOSER SUPERVISION OF DRIVERS.

McHoul (*Brit. Med. Jour.*, September 16, 1916) briefly comments on the need of closer supervision of drivers of all classes with reference to their eyesight. He gives some concrete instances by way of illustration showing how year after year drivers with defective vision escape detection. Men with low vision, with myopia of 12 D., others with disseminated choroiditis, with nystagmus, with occlusio et seclusio pupillæ from chronic iridocyclitis, were found driving vehicles on the crowded public thoroughfares. No yearly inspection is made. Vision may be good at the time of the original examination and may later become defective. There is need of a yearly examination.

Some regulation stringent in character must come in America. Drivers of automobiles are being regularly seen with defective vision and organic eye trouble, ranging from glaucoma and optic atrophy to retinitis pigmentosa and optic neuritis. Measures should be taken to protect others from these possibly otherwise careful but visually defective drivers.